REMARKS

Applicant has carefully reviewed the Final Office Action mailed August 21, 2007 and offers the following remarks to accompany the above amendments.

Independent claims 1, 13, 25, and 37 have been amended to clarify the claimed invention. Support for these amendments may be found in at least paragraphs 0006-0008, 0020, and 0041-0048 of the Specification, as well as Figure 6 and original claims 2, 14, 26, and 38. No new matter has been added. New claims 49-51 have been added.

Claims 2, 14, 26, and 38 have been cancelled. Claims 3, 4, 6, 7, 9, 10, 15-19, 21, 22, 27, 28, 30, 31, 33, 34, 39-43, 45, and 46 have been amended to be consistent with the amended independent claims.

Claims 1, 3-13, 15-25, 27-37, and 39-51 are pending.

Claims 1-8, 11-20, 23-32, 35-44, 47, and 48 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 7,126,996 B2 to Classon et al. (hereinafter "Classon"). Applicant respectfully traverses. For a reference to be anticipatory, the reference must disclose each and every claim element. Further, the elements of the reference must be arranged as claimed. MPEP § 2131. The requirement that each and every element be disclosed in the manner claimed is a rigorous standard that the Patent Office has not met in this case.

Before addressing the rejection, Applicant provides a brief overview of the present invention. The present invention provides an improved channel quality indicator for orthogonal frequency division multiplexing (OFDM) communication environments. In addition to taking into consideration carrier-to-interference ratios, the present invention also takes into consideration the degree to which the channel response varies among the sub-carriers throughout the OFDM frequency band. The carrier-to-interference ratio and the degree of channel response variation are directly or indirectly used by a base station to select coding and modulation schemes for transmissions from the base station to the mobile terminal reporting these factors. Further, scheduling of data sent to the mobile terminal and other mobile terminals competing for the same channel resources may also be based in part on the carrier-to-interference ratio and the degree to which the channel response varies.

The carrier-to-interference ratio and the degree to which the sub-carriers vary are generally measured at the mobile terminal and may be sent to the base station in any number of formats. Measures of each of these indicators may be sent to the base station, which will take the two factors and determine a channel quality indicator. Alternatively, the mobile terminal can arrive at a channel quality indicator value, which is sent to the base station and is then used to select coding and modulation, as well as to assist in scheduling data for transmission.

Independent claims 1, 13, 25, and 37 have been amended to clarify that the channel quality indicator is determined using both the degree to which a channel response varies across sub-carriers over an OFDM frequency band and the carrier-to-interference ratio. Claim 1 is used as an example. Claim 1 as amended recites:

A method comprising:

a) receiving from a mobile terminal an indicator of a degree to which a channel response varies across sub-carriers over an orthogonal frequency division multiplexing frequency band;

b) receiving from the mobile terminal an indicator of a carrier-to-interference ratio associated with the mobile terminal;

c) determining a channel quality indicator based on both the indicator of the degree to which the channel response varies and the indicator of the carrier-to-interference ratio; and

d) controlling transmission of information to the mobile terminal based on the channel quality indicator.

Classon does not teach receiving from a mobile terminal an indicator of a degree to which a channel response varies across sub-carriers over an OFDM frequency band; receiving from a mobile terminal an indicator of a carrier-to-interference ratio associated with the mobile terminal, and then determining a channel quality indicator that is based on both these indicators to be used in controlling transmissions to the mobile terminal, as is recited by amended claim 1. Instead, Classon discloses a method in which mobile terminals or base stations assess the channel coherence time attributes of the mobile terminals (how fast a channel changes) to determine a level of trustworthiness (Classon, Abstract; and col. 5, lines 29-67). If the channel quality data is likely to be untrustworthy, then a first mode is entered, in which a first slow adaptive modulation and coding scheme is used. If the data is likely to be trustworthy, then a second mode is entered and a fast adaptation scheme may be used, in which channel quality data is obtained and used (Classon, col. 6, line 66 through col. 7, line 38). In this mode, a channel quality indicator may be defined, but it is based on a single indicator (Classon, col. 7, lines 39-54). In one embodiment, in either mode, a carrier-to-interference ratio may be used, but it is used as the only channel quality indicator (Classon, col. 11, lines 45). It is not used in combination with a second indicator of a degree to which a channel response varies across sub-carriers over an OFDM frequency band to determine a channel quality indicator. The channel quality indicator in Classon is thus not based on multiple indicators, namely, both the carrier-to-interference ratio and the degree to which a channel response varies across sub-carriers over an OFDM frequency band, as is required by the present invention.

Instead, Classon discloses the use of one factor, such as coherent time attributes, to determine the trustworthiness of the channel quality data to select a transmission mode and then once a mode is selected, transmission control is based on a single channel quality indicator. In both modes, the coding and modulation selection is based on a single indicator. Classon does not teach using both the carrier-to-interference ratio and the degree to which a channel response varies across sub-carriers over an OFDM frequency band to determine a channel quality indicator and then controlling the transmissions on the determined channel quality indicator, as does the claimed invention. Because Classon requires that the trustworthiness of the data first be determined to decide which mode is required, two modes are necessary and two different coding and modulation schemes are needed. Switching between modes and using multiple coding and modulation schemes is not necessary with the present invention, where both the carrier-to-interference ratio and the degree to which a channel response varies across sub-carriers over an OFDM frequency band are used to determine a channel quality indicator to be used to control the transmission of information to the mobile terminal.

In summary, Classon does not teach determining a channel quality indicator based on two other indicators. Because Classon does not teach each and every element of claim 1, claim 1 is not anticipated. Independent claims 13, 25, and 37 contain limitations similar to those in claim 1, and are thus patentable for at least the same reasons as set forth above with respect to claim 1.

Claims 3-8, 11, and 12 depend directly or indirectly from claim 1 and contain all of the limitations of claim 1. Claims 15-20, 23, and 24 depend directly or indirectly from claim 13 and contain all of the limitations of claim 13. Claims 27-32, 35, and 36 depend directly or indirectly from claim 25 and contain all of the limitations of claim 25. Claims 39-44, 47, and 48 depend directly or indirectly from claim 37 and contain all of the limitations of claim 37. Each of the dependent claims 3-8, 11, 12, 15-20, 23, 24, 27-32, 35, 36, 39-44, 47, and 48 are thus patentable for at least the same reasons as set forth above with respect to claims 1, 13, 25, and 37.

Various of the dependent claims of the subject application further highlight the differences between the present invention and Classon. For example, claim 3 depends from claim 1 and recites the further limitation of "wherein the channel quality indicator is a value determined at the mobile terminal, the value being a function of the degree to which the channel response varies across the sub-carriers over the orthogonal frequency division multiplexing frequency band and the carrier-to-interference ratio." Claims 15, 27, and 39 recite similar limitations. Claims 4, 16, 28, and 40 also recite limitations where a value is calculated for the channel quality indicator based on the degree to which the channel response varies across the sub-carriers over the OFDM frequency band and the carrier-to-interference ratio, such that the transmission of information to the mobile terminal is a function of the channel quality indicator value. Classon does not disclose these limitations. In particular, Classon does not mention determining a value for the channel quality indicator that is a function of the degree to which the channel response varies across the sub-carriers over the OFDM frequency band and the carrier-to-interference ratio. In fact, Classon is silent as to any values being a function of the degree to which the channel response varies and the carrier-to-interference ratio. Classon also is silent as to the transmission of information to the mobile terminal being a function of a value for the channel quality indicator. Accordingly, Classon does not disclose or suggest the further limitations as recited in claims 3, 4, 15, 16, 27, 28, 39, and 40. Claims 3, 4, 15, 16, 27, 28, 39, and 40 are thus patentable for this additional reason.

Claims 9, 10, 21, 22, 33, 34, 45, and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Classon in view of U.S. Patent Application Publication No. 2005/0031028 A1 to Chiu (hereinafter "Chiu"). Applicant respectfully traverses. To establish *prima facie* obviousness, the Patent Office must show where each and every element of the claim is taught or suggested in the combination of references. MPEP § 2143.03. If the Patent Office cannot establish obviousness, the claims are allowable.

Claims 9 and 10 depend indirectly from claim 1. Claims 21 and 22 depend indirectly from claim 13. Claims 33 and 34 depend indirectly from claim 25. Claims 45 and 46 depend indirectly from claim 37. Thus, each of these claims contains limitations similar to those in claim 1. As set forth above, Classon does not disclose receiving from a mobile terminal an indicator of a degree to which a channel response varies across sub-carriers over an OFDM frequency band; receiving from a mobile terminal an indicator of a carrier-to-interference ratio associated with the mobile terminal, and then determining a channel quality indicator that is based on both these indicators to be used in controlling transmissions to the mobile terminal. Chiu does not cure the deficiencies of Classon in this regard. Chiu is cited merely for its alleged disclosure of standard deviations. Thus, the combination of Chiu and Classon does not disclose each and every element of claims 9, 10, 21, 22, 33, 34, 45, and 46, for at least the same reasons as set forth above with respect to claim 1.

New claims 49-51 are added. Support for these claims may be found in at least paragraphs 0043-0045 of the Specification. Claims 49-51 depend from claim 1 and are thus patentable based on their dependency from claim 1 for the reasons set forth above with respect to claim 1. In addition, neither Classon nor Chiu, either alone or in combination, discloses or suggests where the indicator of the degree to which the channel response varies and the indicator of the carrier-to-interference ratio are received for multiple transmit and receive antennas, as recited in claim 49. Also, neither Classon nor Chiu, either alone or in combination, discloses or suggests combining the indicators received for the multiple transmit and receive antennas to determine an aggregate channel quality indicator to be used in controlling the transmission of information to the mobile terminal, as recited in claim 50. Finally, neither Classon nor Chiu, either alone or in combination, discloses or suggests the particular way of combining the indicators that is recited in claim 51. Accordingly, claims 49-51 are patentable for these additional reasons.

The present application is now in condition for allowance and such action is respectfully requested. The Examiner is encouraged to contact Applicant's representative regarding any remaining issues in an effort to expedite allowance and issuance of the present application.

Respectfully submitted,

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